THE

VETERINARY JOURNAL

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DECEMBER, 1921.

MR. JOHN BOYD DUNLOP, M.R.C.V.S.

ALTHOUGH perhaps better known through his inventive genius, which gave to the world the pneumatic tyre, Mr. John B. Dunlop was in his day well known throughout his profession in the North of Ireland as a successful veterinary surgeon. In fact, he and his partner, Mr. John Ross, who still carries on the practice in Belfast, in partnership now with his enthusiastic colleague, Mr. J. Ewing Johnston, M.B.E., had always a big practice in that busy city, and the room in which Mr. Dunlop did his first experiments can still be shown to those who ask to see it.

A graduate of the Royal (Dick) Veterinary College in 1867, he was always a staunch supporter of all matters which made for progress in the profession, and was a well-known figure at the Irish Veterinary Association meetings. Even so late as the day before he died he was writing an article which he hoped to have the opportunity of presenting before a meeting of the profession.

The invention of the pneumatic tyre, the fact of his son (who predeceased him) being a well-known bicyclist, the ridicule heaped upon the invention at the start, and the well deserved praise and rewards given to its inventor at the finish, have all been described in the public press and are too well known to need repetition here. We as a profession are proud to think that he was one of us, and that he lived to see the unparalleled success of his invention ; also that, unlike many inventors, he was able to obtain and enjoy the fruits of his labour.

Editorials.

"AT LAST!!"

Agricultural Research Scholarships and Fellowships.

At last, after many weary years of waiting, a small start has been made by the Ministry of Agriculture and Fisheries towards helping the young graduates of the veterinary profession to obtain facilities for study and research work. It is, it is true, not a tenth part of what ought to be done, nor is the amount given any too great; but it is something, and the thin edge of the wedge which, if driven home properly and taken hold of by the right men, will do a very great deal to stimulate and encourage those who have ability but no pecuniary resources with which to develop it.

Now it will be for those who have obtained the prizes to select a proper laboratory in which to develop their talents to the best advantage for the benefit of the profession, and to prove that they are worthy of the confidence which has been reposed in them. The following is an extract from the weekly journal of the Ministry of Agriculture and Fisheries:—

"The Ministry of Agriculture and Fisheries, on the recommendation of the Advisory Committee on Agricultural Science, and with the approval of the Development Commissioners and the Treasury, have awarded Research Scholarships, of the value of £200 per annum, to the following candidates:—

Mr. A. E. Watkins, B.A., Cambridge (Botany), for two years.
Mr. D. Cuthbertson, B.Sc., Glasgow (Chemistry), for one year.
Mr. R. A. Glover, M.A., B.Sc., Edinburgh (Veterinary Science), for two years.
Mr. T. W. M. Cameron, M.R.C.V.S., Royal Veterinary College (Veterinary Science), for two years.

Travelling Research Fellowships of £250 each have been awarded to:

Mr. B. A. Keen, Soil Physicist at the Rothamsted Experimental Station, for a visit to America in the Autumn of 1921.
Professor R. G. Stapledon, Director of the Aberystwyth Plant Breeding Station, for a visit to America in 1922.

The Agricultural Scholarships are open to graduates with honours in Science of a British University who give evidence of high proficiency in subjects having a direct bearing on agriculture. The Veterinary Scholarships are open to students who have secured the diploma of the Royal College of Veterinary Surgeons. The Scholarships have been established to assist such graduates or students to qualify as research workers with a view to their contributing to the development of agricultural and veterinary research.

Travelling Fellowships were instituted last year to enable selected members of the staffs of research institutes aided by the Ministry to visit institutions abroad where work on similar or cognate subjects is carried on and to study at first hand the methods employed there." —*Ministry of Agriculture and Fisheries.* (Nov. 7, 1921.)

WORK OF THE INDIAN CIVIL VETERINARY DEPARTMENT IN BENGAL.

In a further column we give an expert review by one who knows the country, of the Cattle Census report of the Presidency of Bengal, which illustrates some very important work done by the officials of the Indian Civil Veterinary Department in that province. It shows in pretty conclusive fashion the great difficulties under which these officers work and the valuable results they have accomplished in regard to the controlling of contagious disease and the propaganda of hygienic and prophylactic measures for the health of the herds.

In a country like India, where so many factors are at work, where religious and political differences have to be contended with as well as very severe outbreaks of contagious disease, it is really marvellous when one looks at the results which a comparatively few skilled experts have attained; and one shudders when one thinks of the chaos which would reign were such guiding influences to be withdrawn.

Underpaid, even now with the improved conditions, and always understaffed and overworked, it is with pride that their *confrères* in Great Britain admire the thorough manner in which their colleagues in India fulfil the call of duty in assisting to maintain the health and integrity of the Empire.

A PERMANENT PROPHYLAXIS AGAINST TETANUS.

We recommend our readers to peruse carefully an article in this issue by Mr. J. B. Buxton, F.R.C.V.S., D.V.H., on "The Active Immunisation of Horses Against Tetanus," and to get into touch with the author in order to test fully whether what has proved so great a success in the laboratory animal will be equally satisfactory under natural conditions in the field. Should it prove to be possible to confer a permanent and lasting immunity upon all equine stock it will be the duty of the veterinary practitioner in every tetanus infected district to advise all owners of foals and horses to have their animals inoculated and immunised without delay. Should it prove to be a long-lasting immunity the work done by Mr. Buxton will have conferred a boon upon stock and the stockowners which cannot be over-estimated, and the value of the properly trained veterinarian will again have been demonstrated and vindicated.

General Articles.

RECIPROCITY AND THE CANADIAN CATTLE EMBARGO.

By Major-General Sir J. Moore, K.C.M.G., C.B., F.R.C.V.S.
(*Army Veterinary Service* [*Retd.*].)

The pronouncement of the Royal Commission on the importation of store cattle has been made, and speculation is rife as to the probable action which will be taken on the reassembling of Parliament. In the meantime opinion is freely expressed in our daily papers and perhaps more particularly those farming, field, and trade periodicals interested in the question.

Two broad lines of opinion are presented: the one showing the views of the producer and prognosticating retrograde effects which the removal of the embargo will have upon the agricultural industry of this country; the other the relief which the measure will afford to the meat trade, and to the consumer in a cheaper meat supply.

The Commissioners have been criticised as being unrepresentative of the true interests of this country in the question, and disappointment in many sections of our British community has been evinced at their conclusions on the evidence taken *pro* and *con*. It is, however, safe to say that the majority of the thinking public have the greatest confidence in that fine, broad-minded, practical man who was chosen as the chairman of the Commission, and in those proved servants of the State who were associated with him in the enquiry.

In common with others whose whole service up to a retired age has been given to the State and whose mission in life has lain specially with animals and the purposes for which they were created and maintained, I have ventured to add to the opinion already expressed on the subject and in a particular direction which has escaped the field of controversy, and was not apparently within the terms of reference of the Commission appointed. For this reason I am prompted to offer a few remarks, a knowledge and experience of animals and conditions affecting them during thirty years of Government service in Canada, the United States of America, British South Africa (including Rhodesia), Australia, Argentine, India, the Continent of Europe and at home perhaps qualifying me to give an opinion.

An argument based on the fear of the introduction of contagious animal disease in support of the continuance of the Embargo cannot possibly stand. Efficient veterinary services of the Board of Agriculture and the Dominion of Canada exist, and their function is to prevent disease and to safeguard the interests of the agricultural communities of both countries. If with our armies at war under circumstances of vast movements predisposing to the spread of animal diseases, situated as they were in France and Belgium in the midst of

foot-and-mouth disease in cattle, and exposed to the contagion of glanders and epizootic lymphangitis, we can prevent the introduction of these diseases into the United Kingdom on the return of troops, the prevention and control of disease during the easier times of peace is and must be comparatively easy. At all events the argument may be ruled out.

The contention that the agricultural industry of the United Kingdom will be seriously affected by the importation of store cattle is not clear. A visit to the Smithfield cattle markets discloses the fact that 80 per cent. of the beef there displayed is imported, and taking the whole of the markets or trade of the United Kingdom the consumption of home-fed beef is only 56 per cent., the balance being imported as dead meat. Surely there is room here for increase in the production of the home-fed article. It is quite idle to suppose that the public would prefer to eat meat imported in a frozen state, even if it is cheaper, than home-grown beef in a fresh condition, the true " roast beef of old England," renowned throughout the world. The hard-working miner, the manual labourer demands that his meat should be of the best quality, and his preference for the fresh beef of his own country is quite easy to understand.

It stands to reason, therefore, that if the United Kingdom (not forgetting Ireland, the land of " stores ") cannot furnish the desired number of young animals to grow into beef, they should be obtained from other sources. It is above all things most important that the fresh meat market should be increased ; it is unsatisfactory at 20 per cent. London and 56 per cent. for the whole of the United Kingdom. The importation of store cattle would enhance rather than inhibit agricultural industry generally. A greater number of animals as beef would be raised, and a corresponding stimulus to growth of crops would result. There would be no talk of putting land away to forestry. The competition induced by the importation of stores in itself would be beneficial in production in greater numbers.

It would seem to me, however, that the policy which governs this question should be viewed from an Imperial standpoint, and not with insular vision. It is a pity that the Commission was not instructed to include this aspect of it under the terms of reference, and if it is not too late I venture to suggest that advantage would accrue from discussion in this direction.

No one who has lived in touch with our great Dominions and Dependencies beyond the Seas can help being impressed with the strong, deep, and abiding bond of blood relationship between the Mother Country and the rest of the Empire. The war proved it to the death. It is the duty therefore of the Mother Country to throw

away all narrow-minded ideas of policy, and to open out her interests, her enterprises, herself altogether, to those who are bone of her bone and flesh of her flesh, who stood by her in time of peril, and who are ready to do so again when called on. If we are to reap lessons from the late war, one certainly should be an expansion of mind to conform to the vastness of the Empire.

The subject of Canadian store cattle is a small item of that country's concerns, but it reflects the desire of that live pillar of Empire to trade with the Mother Country. Reciprocity between our Dominions and the parent country has always been a burning question in Colonial minds, and to bring it down to the simple parallel of a family circle, it is not difficult to understand. Moreover, when the child is not comfortable in the family circle, it is apt to wander elsewhere. I call to mind the opinions expressed by influential Canadian friends on the subject of Reciprocity when on a mission to Canada in 1904. The mission was occasioned by the necessity for the preparation of a scheme of horse purchase in the event of war ; the intention being to conduct business in Canada, our own colony, instead of in the United States, a foreign (and in war perhaps a neutral) country. Naturally the subject of reciprocity could not escape remark, and it was said that Canada desired reciprocity with the Mother Country in matters of trade generally. If this was not forthcoming it was feared that reciprocal arrangements with her next-door neighbour would result, which would be " the beginning of the end " ; in other words, the interests of the two contiguous countries would so merge into each other that ultimately they would become one whole. Such a picture is quite conceivable.

It is most vital from an Imperial point of view to preserve by every means in our power those relations of Empire which make for prosperity and solidity.

In the matter of our meat supply we fall short of an Imperial standard. It must be a grief to anyone having Imperial interests at heart to note that by far the greatest amount of the imported beef consumed by the people of the United Kingdom comes from countries which have no connection with, or rather do not form part of, the community of nations known as the British Empire. We have only to consult the market columns of our London daily papers to realise that this is too true, and a visit to the Central Markets at Smithfield will confirm it. We also witness at these markets the names of Argentine, American and other providers of beef who do not represent our Colonial interests. The situation in my opinion suggests that Imperial rights should have better recognition, and the present time, with the conclusions of the Commission fresh in our minds, is a favourable one

for action. The suggestion carries the subject beyond the mere importation of store cattle and points to the desirability of consideration of custom with Canada in the dead meat trade. Recently a consignment of chilled meat was received in the London market from that country. It was landed fourteen days after being killed at Toronto, and in my opinion it was prime meat. Chilled meat is the nearest approximation to the fresh article, and it requires no explanation to convince the public that if beef can be imported under a chilled process in such good, wholesome condition and in that comparatively quick period of time, it is better than resorting to countries further afield, where a hard freezing process is necessitated. From a market point of view hard frozen meat is not altogether satisfactory to the public, though it may be eminently so to the trade. Unlike fresh fruit or fresh meat, which must be sold within a limited time or perish, hard frozen meat has an indefinite existence in the supply market. If it is not used to-day it can be kept till to-morrow, next week, next month, or next year for the matter of that. The length of time it has been in cold storage necessarily must be variable in accordance with demand or market. The public have no guarantee as to the age of the meat they are asked to consume, for, excepting in the case of Dutch importations (veal and pork chiefly), there is no indication on the labels attached to the carcases which would enlighten the retail trade or consumer as to the date of slaughter, inspection, or laying down to cold storage. It is an aspect of trade which I think the public has just reason to expect should be put on a better basis. It is quite fair and right that the person who pays the piper should have a say in the selection of the tune. I am aware of the report that a side of beef after eighteen years in cold storage was pronounced quite fit for food, and specially good in extractives, but antiques in food savour of the abhorrent, and it goes without saying that the fresher the meat the better it is appreciated by those who have to consume it. If one of our Colonies can help us out in meat in a comparatively fresh state within fourteen days from the date of slaughter, obviously our support should go out to her in preference to that given to countries outside our Empire. It is an outlook of trade that would suit Canada better than even the importation of live store cattle, which at best carry a lower trade value than full-grown meat. At the same time the open door of importation of young stock should be maintained to encourage the greater output of home-fed fresh beef, which is appraised at home beyond all others, and to stimulate the animal-husbandry side of agriculture, the raising of stock in greater numbers, and the continuance of the quality of our herds, for which we are famous. The custom to Canada would correspondingly reflect on her to her advantage, increasing her prospects

and facilities for colonisation and for the employment of young Britons whom she desires as settlers. It is earnestly hoped that our British public at home will not forget their fellow Britons beyond the seas, and will not allow vested interests to prejudice their duty of furthering the prosperity of our great Empire.

Clinical.

NOTE ON THE LIMIT OF THE BREEDING AGE OF THE THOROUGHBRED MARE.

By W. A. WOOD, C.B.E., M.A., M.R.C.V.S.
(*School of Agriculture, Cambridge*).

In order to ascertain at about what age the thoroughbred mare ceases to breed, I went carefully through the lists of mares and their produce, contained in the first volume of the General Stud Book. This book covers a period of about one hundred years, commencing shortly after the year 1700 A.D.

For a considerable number of the mares the exact date of birth is not given, in a few cases the exact date of last foaling is not recorded, and some mares are shewn as being exported or dying at an early age.

I was, however, able to find 1,216 mares, the dates of whose birth and last foaling were recorded; of these mares a few are shown as having aborted one or two years after the birth of their last foal. In these cases I have counted the date of last abortion as last date of breeding, as the fact that they were in foal is good evidence that the reproductive organs were still active.

Of the 1,216 mares I found that—

709 or 58.3%	were breeding at the age of ..	18
648 or 53.05%	„ „ „ „ „ „ ..	19
548 or 45.07%	„ „ „ „ „ „ ..	20
457 or 37.58%	„ „ „ „ „ „ ..	21
333 or 27.38%	„ „ „ „ „ „ ..	22
248 or 19.01%	„ „ „ „ „ „ ..	23
146 or 12.01%	„ „ „ „ „ „ ..	24
85 or 7.00%	„ „ „ „ „ „ ..	25
37 or 3.06%	„ „ „ „ „ „ ..	26
17 or 1.43%	„ „ „ „ „ „ ..	27
7 or .61%	„ „ „ „ „ „ ..	28
4 or .27%	„ „ „ „ „ „ ..	29
2 or .11%	„ „ „ „ „ „ ..	30

and 1 is shown as having produced a foal when 33 years old.

As far as one can judge from the above figures, it appears probable that in actual practice the mare continues to be capable of breeding

so long as she lives ; the fact that many even of the mares that had foals at 25 years or over are recorded as having been covered or dying one or two years after their last foaling, suggests that in the majority of cases the mare does not live to an age at which she becomes incapable of breeding ; this is no doubt due to the fact that the length of life of the horse largely depends on the condition of the teeth, and these usually become useless before the ovaries cease to function : hence it is practically impossible to fix any definite period at which the mare reaches her climacteric.

Seeing the great age attained by a very large percentage of these mares, it is interesting to note that the 80 stallions whose death is recorded in the obituary list in Vol. I, General Stud Book, died at an average of 22.7 years.

THE ACTIVE IMMUNISATION OF HORSES AGAINST TETANUS.

By J. B. BUXTON, F.R.C.V.S., D.V.H.
(*Veterinary Superintendent, The Wellcome Physiological Research Laboratories, Herne Hill, London*).

THE clinical value of protective injections of tetanus antitoxin in horses and other animals is well known and has been definitely established as a result of prolonged usage.

It is also well known that the *passive* immunity which is conferred upon man or animals by such means is necessarily of a transitory nature. While the elimination of the antitoxin in man is, because it contains heterologous or " foreign " proteins, naturally more rapid than is the elimination of the homologous serum from horses, it is, nevertheless, certain that after the lapse of a few weeks the amount of antitoxin remaining in the system of the horse is probably never sufficiently high to protect the animal against a fatal intoxication.

It has long been known that more or less balanced mixtures of diphtheria toxin and antitoxin stimulate the body cells to produce their own antitoxin, and that the *active* immunity so produced persists for a very much longer time than does the *passive* immunity conferred by an injection of antitoxin alone. As long ago as 1907 Theobald Smith (*Journal Med. Research*, 1907, XVI, 359) suggested the possibility of protecting man against diphtheria by means of such mixtures, and subsequently showed that such an immunity could be produced in experimental animals. The mechanism of this reaction was ascribed by Behring (*Deutsch. Med. Wochenschr.*, 1913, XXXIX, 873) to the instability of the union of toxin and antitoxin, so that after the injection of such a neutral mixture into animals a certain amount of toxin

becomes liberated and stimulates the body cells, which produce their own antitoxin. It is not finally decided whether this is so, or whether the action of antitoxin upon toxin is such as to render it incapable of producing its specific poisoning, while interfering to only a slight extent with the power of the toxin to cause the production of antitoxin in the animal; that is, converts it into a modified toxin which has lost its pathogenic but not its antigenic properties.

In the process of the active immunisation of many horses against tetanus toxin in the preparation of tetanus antitoxin during the war he found that the injection of such neutral mixtures of tetanus toxin and antitoxin in non-immune horses produced a valuable *active* immunity.

A short experiment was therefore carried out by Dr. R. A. O'Brien, Mr. Glenny and myself, and it was found that several horses which had been so treated with neutral mixtures of tetanus toxin and antitoxin withstood after an interval of a few weeks an intramuscular injection consisting of sterile garden soil, together with 2 cc. of an actively growing culture of the tetanus bacillus, representing many fatal doses.

The possibilities of this method of inducing an active and lasting immunity against tetanus will undoubtedly appeal to practitioners, more particularly to those who have experienced cases of so-called "delayed" tetanus.

The suggestion arises that mixtures of tetanus toxin and antitoxin would similarly cause the production of active, and therefore lasting, immunity against tetanus; my colleague, Mr. Glenny, has found that this expectation is justified by experiment.

THE COW, THE RINGWORM, AND THE PRETTY PARLOURMAID.

By ALFRED EDDOWES, M.D., 28, Wimpole Street, W.

I.

THIRTY years ago, when I was practising in the country, a young woman consulted me one evening for what was obviously ringworm on her cheek. A number of questions were put to her as to how she had caught it. She was a parlourmaid and "had nothing to do with children, ponies, cats or calves." I begged her to look round on going home and send me word if she noticed anyone else with anything like it. Next morning a man stepped into my consulting room. Seeing a ringworm on the centre of his forehead I merely asked his name and told him I could guess all the rest. "He was cowman to

Mr. C. of S—— Park; that he had not been at the job long—was, in fact, quite a novice—otherwise he would have had a cap ready to wear while milking. Further, that he was in love with the pretty parlourmaid," and no wonder! "Doctor, you know too much, but it's all true," was his reply, and I almost fancied myself a Sherlock Holmes!!

II.

RINGWORM FROM HEDGEHOG.

In this case a young lady had ringworm on the front of her wrist and on her chin, the position suggesting the caressing of a pet. The pet turned out to be a little wild hedgehog, on and in the abdominal prickles of which I found ringworm fungus. This case has already been reported in medical journals.*

BLEEDING IN A COW.

By G. MAYALL, M.R.C.V.S.,
Bolton.

Called on June 6 to a black and white horned cow, 5 years old, messenger saying she was bleeding badly at the back. Took liquor ferri. perchlor. fort, artery forceps, chloroform (Wellcomes) and two clean linen cloths. On arrival found the shippon floor streaming with arterial blood, which was coming in jets from the vulva. On opening and stretching the lips of the vulva, and looking inside the vagina, could see an artery spurting in lively fashion, and on exploration found a punctured wound commencing three inches inside the vagina, extending two or three inches deep, and evidently severing an artery on the right side of the passage. All attempts to secure the artery with a forceps failed, and the difficulty was rendered more pronounced by the restiveness of the cow, which kept kicking and side-stepping, and was little better with a figure of eight rope round the hocks. Finally I decided to chloroform her, which I did with a piece of tow soaked in chloroform and put inside an old piece of rug and held to the nostrils, the rug round the head. The cow went down in about five minutes, with about 1½ ounces of chloroform, and I proceeded to again try to get the forceps on the artery, but failed to check the flow by this means. I then fell back on the linen cloths, and two I got from the owner, besides the two I had. I rammed all four well into the vagina, so that it was filled up with them, and the end of the last cloth I soaked in liquor ferri perchlor., so that it would come in exact

**Translated Derm. Soc. of Great Britain and Ireland,* Vol. iv., 1897, p. 32 Illustrated).

contact with the wound and the bleeding artery. In this way, after exerting pressure with my thumb and putting in pieces of tow soaked in liquor ferri perchlor., I eventually stopped the bleeding, and leaving instructions with the owner as to how to proceed in the event of recurrence of the hæmorrhage, I came away, after having spent quite an hour and three-quarters on the job. The cow came round nicely from the chloroform, which was of course not pressed, and next morning, on calling and removing the cloths and dressing the passage with zinc ointment, we let her out, and she grazed as if nothing had happened, although she must have lost nearly a stable bucketful of arterial blood. I also gave her four doses of liquor ferri perchlor. internally.

It was a mystery how the wound occurred. The owner thought it was possibly due to being horned, but this was by no means certain. Curiously enough, hæmorrhage in the cow, of which I have had two serious cases, both due to punctured wounds, has caused me great trouble to check. My first case was eventually stopped by the application of a red-hot kitchen poker.

ON A FURTHER OCCURRENCE OF THE LANCEOLATE FLUKE (*DICROCŒLIUM DENDRITICUM* RUD) IN THE LIVER OF A BRITISH SHEEP.

By E. M. LIND HENDRICKS, B.Sc., and A. W. NOEL PILLERS, F.R.C.V.S., *Liverpool.*

In The Veterinary Journal for December, 1919 (New Series, Vol. 26, p. 206) one of us (A. W. N. P.) recorded finding for the first time in his experience the lanceolate fluke (*Dicrocœlium dendriticum* = *D. lanceolatum* Mehlis) in the liver of a Scotch lamb. The parasite was unaccompanied by the common liver fluke (*Fasciola hepatica*). In the present case a liver showing the typical lesions of fluke disease was obtained from the local abattoir for museum purposes. On being dissected by E. M. L. H. it was found, in addition to harbouring *F. hepatica* to be very heavily infested with *D. dendriticum*. The worms were identical in structure to that figured in the previous record. No very exact count can be given of the number of this species present in the liver, but as it was from an adult sheep an estimate was made from a given quantity of tissue. In this way it may be stated that there were well over 2,000 specimens in the whole organ. Some delay elapsed between the dissection of the liver and getting into communication with the man who supplied it, and in the end all attempts to trace the exact origin of the host failed. In all probability it was a Scotch animal. No further case has apparently come through the

same channels to the same butcher. This fluke appears to be very rare in these Islands. No reference was made to it in articles dealing with the disease when it was so widespread in Wales at the end of 1920 and early this year. There is, however, apparently some area where an animal can become heavily infected, and under suitable conditions of moisture, and with the presence of the intermediate host, such an animal would spread the infection.

A SUCCESSFUL SEQUEL TO PERSISTENT "TAPPING" IN ASCITES.

By E. H. STENT, M.R.C.V.S.,
Manchester.

The following are the particulars of a case of a fox-terrier bitch (now ten years old) which was exhibited before a meeting of the Lancashire Veterinary Medical Association at Manchester on December 11, 1919. The case was one of Ascites, which I tapped on the following dates taking from 3 to 4 quarts of fluid on each occasion :—December 12, 1919; January 6, 1920; March 25, 1920; April 16, 1920; June 12, 1920; August 14, 1920; October 8, 1920; November 30, 1920; December 23, 1920; and February 10, 1921. After this date the filling entirely ceased, and she is, up to date, very fit and well, and as active as a young dog. After the first six months I gave up medicinal treatment other than 3i of Epsom salts once a week and cod liver oil and emulsion once daily.

HAEMOPHILIA.

By E. H. STENT, M.R.C.V.S.,
Manchester.

One frequently meets with this condition to some extent after extracting teeth of dogs, but this case was one of an Irish terrier, ten months old with perfect teeth and gums.

It was brought to me and described as having vomited blood, but after observation it was found that the blood was coming from the gums around some of the molars, and from the back of the upper incisors. Astringent lotions were tried and adrenalin injected. This acted for a time only, and tamiform was packed between the teeth and gums, but without permanent result. The dog died on the third day from loss of blood. This condition I have since learnt is supposed to be due to a lack of calcium in the blood, so obviously liquor calcio if it had been given at first might have been of benefit.

Abstracts.

THE VACCINATION OF CATTLE AGAINST TUBERCULOSIS.*

By Professor A. CALMETTE
(*Sub-Director of the Pasteur Institute, Paris*) ;
Author of "The Bacillary Infection and Tuberculosis in Man and Animals."

The great sensibility of cattle to infection by the Koch bacillus of bovine origin is a very favourable medium for the experimental study of the various processes of active immunisation against tuberculosis. One must, indeed, admit that this sensibility to infection by the bovine bacillus is at least equal to that of man by the bacillus of human origin, inasmuch as the greater number of animals submitted to permanent domicile in an infected area react positively to tuberculin in the first five years of their existence. If some amongst them escape infection, it is because the duration of their life is greatly shortened for economic reasons. Were they permitted to grow old, all of them would show tuberculous lesions at the time of their natural death. It is, therefore, very interesting to try to discover whether it is possible, by utilising the young cattle, to confer on these animals a sufficient resistance to the natural infection so that they can, whilst continuing to live in close cohabitation with the adult tuberculous cows, escape the contamination spontaneously produced in the infected stables.

The numerous experiments which have been made during the last twenty years by various investigators have not produced satisfactory results. One remembers Behring's experiments with his method of "Jennerisation," which consisted in inoculating young calves twice by the intravenous channel, at a three months' interval, the first inoculation with four milligrammes and the second with twenty milligrammes (dry weight), with a culture of human bacilli. The animals thus treated are found to have only a few months' resistance to the infection by prolonged cohabitation with cattle having open tuberculous lesions, and a fact still more serious is that for a long time they eliminate in an intermittent manner, through their dejections, and especially by their mammary glands during periods of lactation, tubercle bacilli which keep the form of the human type and would seem to offer very great dangers to man. Other experiments carried out by R. Koch and Schulze with their "Tauruman" (bovine bacilli of enfeebled virulence), and then by S. Arloing with a human bacillus in homogeneous culture, gave the same results.

* We are indebted to Dr. D. Barty King for the English translation of Professor Calmette's article, which was sent to us in French.—Editor, *B. J. T.*

This important article is abstracted from the British Journal of Tuberculosis by kind permission of the Editor, Dr. T. N. Kelmack, M.D.)

A number of experiments which I made in collaboration with C. Guérin showed me that to obtain the immunity of the organism to bacillary infections, such as are spontaneously manifested in young people who have been healed of a benign tuberculous infection, it is necessary for this organism to remain parasitised by bacilli, but that these bacilli should not produce follicular lesions or tend to the formation of tubercles.

Thanks to an artificial culture, which consists in growing the bovine bacillus in a number of series of successive generations on a food medium of boiled potatoes in glycerinated bile of beef at 5 per cent., we have arrived at creating a culture of bacilli of very feeble virulence for small laboratory animals, perfectly tolerant to high doses by intravenous injection, and incapable of producing tubercles. It is this biliary (or biled) bacillus, non-tuberculined and lowered to a dose of several milligrammes for the rabbit, guinea-pig, monkey, and man, that we actually utilise for our experiments in the vaccination of young calves.

During the first days after birth, we inject by the venous channel at least twenty milligrammes of a living culture of our bacilli, and leave the young cattle thus treated in intimate contact in the stable with cows suffering from open tuberculous lesions. Up to the present, the conclusions which we have arrived at show, first of all, that the biliary (biled) bacilli are well tolerated by the lymphatic organs, that they produce no follicular lesions, and that they determine a manifest resistance, not only to the natural infections by cohabitation, but even to the infections provoked by intravenous experimental inoculation of tested virulent bacilli.

We have not yet come to a decision as to the duration of the resistance ; it hardly seems to extend to over a year, and it only persists as long as biliary (biled) bacilli remain in the organism. When these bacilli have disappeared, when they have been eliminated by the natural channels of excretion of the cellular wastes—principally by the bile and the intestines—these animals become again sensible to tuberculous infection, but then vaccination can be renewed without harm. We have repeated it as often as three times in the same animal in three years, and then the resistance of the natural infection has been maintained for an equal lapse of time.

The pursuit of these experiments in the normal condition of the life of the cattle in the stable will show that it is possible to count on this method of vaccination to prevent the animal from contracting tuberculosis in an infected area. For here is the goal that must be attained. If one reaches it by utilising, as we do, a bacillus non-tuberculined, innocuous at the same time to both cattle and man, one could hope

that an analogous procedure would permit of realising the immunisation of young children, directly after their birth, in such a manner that they could resist the family contamination for the whole period of their existence during which they are more particularly exposed to serious infections which are so often fatal.

Only an experiment on young anthropoid apes, in a region free of tuberculosis—for instance, in a locality on the West Coast of Africa, which is the native habitation of the chimpanzee—can give us the opportunity of verifying this hypothesis. It is therefore urgent to undertake it, and this is what we propose doing as soon as it is possible to gather together the necessary means.

ASPERGILLOSIS OF THE FOWL.

By H. H. CURSON, M.R.C.V.S.
(*Veterinary Research Officer, Grahamstown.*)

Introduction.

The above disease appears to be widely distributed throughout the Eastern Province, and is quite probably enzootic in other parts of the country. As none of the available South African literature contains any reference to the malady, it seems necessary to draw the attention of poultry farmers and others to the serious losses it may cause, and a short, plain account of the symptoms and other more important details should be of some service to those interested. Walker,* formerly of the Veterinary Research Laboratories, Pretoria, investigated a similar complaint of ostriches commonly known as chick fever or yellow liver, but unfortunately the results of his researches are too little known. and there are hundreds of farmers to-day who still speak of chick fever and are unaware of its cause and nature. In Europe, aspergillosis was first recognised over a century ago, and has been stated to affect domestic animals and even man, in addition to all classes of birds.

Definition.

Aspergillosis, also termed pneumomycosis, is a disease due to the presence and multiplication of a fungus or mould, *Aspergillus fumigatus*, in the respiratory system. It is characterised by the presence of exudates and formation of nodules, generally in the gullet or lungs, but lesions may occur in other parts of the body such as the eyes, windpipe, liver, or bones.

Cause.

The *actual* cause, as stated in the previous paragraph, is a fungus. When infection takes place, either by ingestion or inhalation, but probably chiefly the latter, the spores under favourable conditions, including those of warmth and moisture, germinate, leading to the

* Walker, J., Third and Fourth Reports of the Director of Veterinary Research, 1915, page 535.

formation of a mass of interlacing and colourless branched filaments somewhat resembling fine cotton wool or cobwebs. From this loosely woven structure certain fertile filaments or hyphæ give rise to spore-bearing branches or sporophores, and these again produce short stalks from which are abstracted chains of bluish-green round spores of microscopic size. The fine spores, quite invisible to the naked eye, occur in the air, and germinate when they find suitable conditions.

The fungus is ubiquitous, being found along with other moulds in the soil, and particularly on damp and decaying vegetation. That aspergillus is responsible for disease is determined by microscopic examination of the nodules and other lesions, but the conditions which lead to the free living fungus becoming virulent, and thus disease-producing, are not well understood. In some cases there would appear to be some association with weather or seasonal changes; in other instances, for example, where infection has broken out in a run of birds low in condition, it is surmised that the debility has been favourable for the germination of the spores, which otherwise would not have developed in healthy poultry.

The *predisposing* causes are those which reduce the vitality and so render the bird more susceptible to the development and multiplication of spores should these be inhaled or taken in with the food. Such influencing factors are :—(*a*) Internal parasites, including tape worms, round worms, and coccidia; (*b*) infestation with external parasites, *e.g.*, fowl ticks, lice, fleas, and mange mites; (*c*) extremes of climate, such as severe droughts or prolonged rains; (*d*) unhygienic surroundings; and (*e*) insufficient and unsuitable food.

Symptoms.

These depend on the course and extent of the disease and the age and stamina of the fowl. The malady may be either *acute* or *chronic*, the former condition being generally found in chicks, whereas older birds more often suffer from the chronic form.

In *acute* cases—that is when the disease appears as an epizootic and is responsible for a large number of birds being affected within a short space of time—the period of visible illness may only be twenty-four to forty-eight hours, but it is usually longer, varying from three to five days. In a few cases death may not occur for a week. The first indication of something amiss is generally the fact that a few chicks have died suddenly and, on examining the remainder, some may be found to have a watery discharge from the eyes and their general behaviour is far from normal. The combs become purplish-blue in colour and there is a loss of appetite, disinclination to run about, the head is rested close to body, the eyes are half closed, and within the lower lip is present a sticky cellular exudate. The attitude is one

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of dulness and depression. Later, the breathing is hurried, the mouth is frequently opened and a painful gasping sound is uttered. Thirst is acute at this stage owing to the elevation of temperature and the head is frequently shaken. As weakness becomes more marked the wings droop, the feathers do not lie uniformly, and at length from sheer exhaustion the bird falls to the ground. Following on the continued interference with respiration, sufficient oxygen is not obtained, and death results from asphyxia.

The *chronic* type of aspergillosis may occur as a sequel to an epizootic or exist as an independent affection in adult fowls owing to the greater resistance of mature birds. The train of symptoms described above may be observed, but the course of the malady is less rapid, allowing time for lesions to be developed in the upper air passages. Pale-yellow cheesy nodules, varying in size to a lentil, sometimes are to be found at the back of the throat, or otherwise the material present is a dirty fibrinous exudate, the removal of which often leaves a relatively deep ulcer. In many cases no lesions appear at all in the mouth or throat, and one's suspicions are aroused by the loss of condition, which, in spite of good feeding, is followed by intense emaciation. There may be a rattling during respiration as a result of mucous material being present in the nostrils or throat. Thirst is not so marked as in the acute form and appetite may be diminished. Sooner or later a relapse occurs, and if death does not supervene as a result of the debility it surely follows an attack of respiratory trouble as seen in the acute type. Birds that recover, or in which the disease lies dormant, often have a peculiar expression of the eyes, should these have been the seat of a discharge. The eyes are bright and sight is unimpaired, but blinking is frequent and the eyelids do not open to the full extent. Lesions involving other parts, *e.g.*, bones, would naturally lead to lameness or difficulty in walking. and in cases of liver infection there would be jaundice and digestive derangement.

Post-mortem Appearances.

In *acute* cases there is very little to be observed. The eyes may show either a watery discharge or an accumulation of catarrhal material heaped up within the lower eyelid, giving the eyeball a distended appearance. In cases of longer duration yellow cheese-like nodules or fibrinous material may be seen in the throat, windpipe, or gullet, and if this material be removed the tissue underneath will be seen to be ulcerated. There is generally marked congestion of the lungs and liver and the heart is flaccid and dilated. The comb is generally purplish-blue, as mentioned above.

The *chronic* form of the disease is characterised by marked emaciation and the presence of nodules in the lungs. The nodules are

pale yellow, circumscribed, firm, and vary in size from a pin's head to a lentil. Such lesions may also be seen in the liver, which itself is generally in a state of fatty degeneration, being paler and more friable than normal.

Differential Diagnosis.

As many epizootics arise in more or less the same manner, *e.g.*, several birds are suddenly noticed dead and others ill, showing signs only of listlessness, discoloured combs, and refusal to eat or move about, an endeavour will be made to indicate—*apart from microscopic examination*—the chief differences between aspergillosis and other common fatal diseases.

Avian Diphtheria or Roup.—This disease is the one most easily and most frequently confused with aspergillosis, and, indeed, it is often difficult to distinguish clinically between them. Both also may occur at the same time of the year, usually the winter and spring, and in both may be present the fibrinous exudates and cheese-like nodules. In roup, however,(*a*) the history shows some intercommunication with diseased birds, in other words, the infection is usually introduced by a recent arrival, an exhibit at a show, or infected crates. (*b*) The lesions of the mouth and throat appear to form more quickly, and when the diphtheritic layer is removed the underlying tissues do not show the same degree of injury, and the abrasion, which may be absent, is more or less superficial. (*c*) The discharges are more profuse and catarrhal and have a fœtid odour which is apparently characteristic. (*d*) The disease is less virulent and more usually runs a subacute course. (*e*) General preventive measures are usually attended with success, there being an abatement of the mortality after reasonable precautions have been exercised; and (*f*) finally, diarrhœa is not uncommon owing to catarrh of the alimentary tract.

Epithelioma Contagiosa or Chicken-pox.—Although some recent European investigations tend to show that chicken-pox and roup are due to the same causal organism, yet as the prevalence and clinical appearances of these diseases in South Arfica are usually different they will be treated separately. Chicken-pox is (*a*) relatively a mild affection, the mortality when care is taken not exceeding 10 per cent.; (*b*) it is generally prevalent at the end of summer or autumn; and (*c*) it is rarely that complications such as the presence of diphtheritic layers or discharges (watery or catarrhal) are observed.

Tuberculosis may show similar symptoms to those seen in the chronic type of aspergillosis, but it is generally (*a*) more insidious and (*b*) accompanied by diarrhœa. One is seldom likely to confuse acute aspergillosis, the more common form of the disease, with tuberculosis.

It must be pointed out that the possibility of aspergillosis and one or other of the above diseases coexisting on the same premises must always be taken into consideration, and it is that fact that renders diagnosis so difficult and unsatisfactory. However, by laboratory methods, such as microscopic examination of lesions, animal inoculation, and cultural tests, it is possible to arrive at a definite diagnosis, without which a poultry breeder is discouraged by the fact that he cannot adopt proper precautionary measures.

Curative Treatment.

In *acute* cases this is useless. No time should be wasted on attempting to cure hopeless cases, as all one's energies should be devoted to precautionary measures. In *chronic* cases medicinal treatment is generally a failure, but if the birds are well bred, and therefore of some value, the following routine measures are advised :—

(*a*) Segregate sick birds, not only for the sake of convenience, but also because the discharges of diseased fowls are laden with aspergillus spores, probably in a highly virulent state.

(*b*) Attend to each bird individually, and alleviate the most distressing symptoms. The mouth should be opened wide and the cheesy material, if present, should be removed and the abrasions beneath touched with a stick of silver nitrate. The eyes are to be washed with a 1 per cent. solution of potassium permanganate after clearing away the discharge with a piece of cotton wool. It is important to remember that cotton wool and pieces of cloth containing discharges are to be collected and burnt. This procedure should be undertaken twice daily, and it will be found more expeditious if the head is dipped into a basin containing the potassium permanganate solution instead of bathing each eye separately.

A tonic should next be given. There are many excellent mixtures, but a medicine which not only increases the appetite (and thus directly brings about stimulation of the various functions) but which at the same time has a direct action on the chief functional regions is desired. *Nux vomica* is such an agent, for it stimulates the heart action, respiration, appetite, digestion, and intestinal peristalsis. For an adult fowl (large breed) 10-grain doses may be given daily for seven days. The following week 5-grain doses daily of quinine should be substituted in order to prevent strychnine poisoning, and so on alternately. If there is constipation give one tea-spoonful castor oil fasting, and diarrhœa may be checked with five drops of chlorodyne in half a teaspoonful of water.

Drugs are best administered to fowls in capsule form, or failing that by means of pills, which can be made up with dough.

(*c*) Accompanying above steps it is essential to give the poultry an easily digestible and nutritious diet, *e.g.*, linseed jelly, clotted milk, minced meat, or fish meal. It is, of course, important that only clean water should be used, and this must be changed twice daily. Sufficient light and ventilation are similarly essential.

In commencing the description of treatment advised in chronic aspergillosis it was mentioned that sick birds should be segregated. The course of action for remainder of birds is now to be considered. This will be referred to in the next paragraph.

Preventive Treatment.

Birds kept in confinement, *e.g.*, in runs in town, usually become infected from mouldy food or litter brought to the premises, whereas on farms the infection appears to originate on the land on which the birds are running, *e.g.*, lucerne paddocks. Such paddocks are generally irrigable and contain much humus in the soil, and it will be at once realised that such factors are favourable for the development of fungi.

When running space is limited all that can be done is to disinfect the run and fowl-house as thoroughly as possible.

Hycol, 1-1000 solution, is stated to give good results. The woodwork, floor—in fact, all the fittings—should if possible be scrubbed with soda and boiling water.

Disinfection on farms is for obvious reasons impracticable unless the actual source of the infection can be traced. It is, therefore, recommended that all birds apparently healthy should be taken on virgin ground—the higher the situation the better on account of drainage—and if there is no shade, shelters of corrugated iron should be erected.

It will naturally be understood that all carcases are to be disposed of by deep burial or incineration—preferably the latter.

It is convenient at this stage to make reference to the condition known as "dead in shell." This was shown by Walker* to be due in many cases to aspergillus infection contracted in the incubator-room. Here only preventive measures are of service, and unless eggs and incubators are kept from the spores of fungi, hatching results will always be unsuccessful.

* J. Walker, *loc. cit.* 1.

The problem as to the preservation of incubator-rooms from fungi is an exceedingly difficult one, and is a question which demands more attention.

There is no doubt that our knowledge of fowl diseases in general is extremely limited, and if by the perusal of this article this fact has been emphasised it will be felt that a useful purpose has been served.—*Journal of the Department of Agriculture, September,* 1921.

Reviews.

THE CATTLE CENSUS REPORT OF THE PRESIDENCY OF BENGAL, 1920.

To the Report of the Cattle Census of the Presidency of Bengal, which was taken between January 6 and 13, 1920, is attached a large number of appendices containing a mass of figures. Regarding these the Director of Agriculture, Bengal, notes that "No claim for exactness can be set up for these figures, but on the whole they can be accepted as fairly correct. It is hoped that when the principles on which the enumeration should be made are better understood more accurate results will be secured."

Everyone who has had any practical experience of the difficulties which always spring up whenever any attempt is made to accurately enumerate anything in India, will sympathise with the Director of Agriculture. In Bengal where the agriculturists are almost entirely Hindus, these difficulties would be greatly accentuated when the counting of the cattle was undertaken. No one without Indian experience can appreciate the exasperating strain which any attempt at accuracy in taking a cattle census amongst these people entails on the European mind. To accept the figures as even "fairly accurate" requires more reliance on the work of the Bengal Panchayats than usually remains to those who have experienced the working of these Councils, even when this is carried out under the general supervision of the already over-worked district officers.

This is the second census of its kind, the first being taken in 1912, and during the period which has elapsed between the two censuses, although famine conditions and floods, droughts and cyclones have appeared in parts of the province, there has been no marked scarcity of fodder for the stock. It is stated that "outbreaks of cattle diseases were, as usual, very common during these years, but they appeared to be most severe in 1917-18. In that year rinderpest in a somewhat virulent form appeared in several districts, and especially in 24-Parganas, Noakhali, Rangpur and Bakarganj."

The chief points brought out by the statistics are :—

(*a*) The increase in the number of Brahmani bulls which is 19.12 per cent. over that of the 1912 census. A Hindu receives considerable religious credit by letting loose a young bull, but it has frequently been reported that latterly the animals selected for this purpose are as often as not poor specimens of their breed. These Brahmani bulls wander over the country living at the expense of the inhabitants, especially the farmers and shopkeepers, who often suffer very severely from their depredations. When the country was more sparsely populated, and these bulls were more carefully selected, there is no doubt they went far to supply the necessary males required for the large number of cows ; but latterly with an increased population and more intensive cultivation it is doubtful whether these Brahmani bulls are not in reality a source of loss to the population. There can be no doubt but that they contribute a very decided restraining factor to any steps which may from time to time be taken to improve the breed of the cattle in a district, and their unrestrained movement over the country gives rise to a serious menace of spreading contagious disease.

The Brahmani bull is not by any means an unmixed blessing, and we greatly doubt whether the increase in the number of these animals during the eight years which intervened between the two cattle census has made for the progress of the cattle industry in Bengal. Every enthusiastic gardener in India must have experienced the destruction of many weeks of work owing to one of these bulls gaining access to his compound, and will consequently not welcome any increase in their number.

(*b*) An increase in the plough cattle of 4 per cent. If it is an actual increase and not merely due to more conscientious reporting, this is a step in the right direction. The plough cattle, which in addition to cultivating the fields also work at the wells, are the mainstay of Indian farming. It has been truly said that they carry the agriculture of the country on their backs. It will be a very long time before the tractor will be in general use on the plains of India, where, as a rule, the holdings are small and irrigation is absolutely essential to the raising of certain crops, consequently any increase in the *plough cattle* is a distinct advance, and incidentally accentuates the demand for an up-to-date efficient Veterinary Service. The plough bullock is usually of the same breed as the milch cow, and the male buffaloes used for ploughing are also the same as the milch buffaloes, being the inferior males which are not selected for breeding.

(*c*) The increase in the number of milch cows 13.44 per cent. points to an increase in the prosperity of the villagers.

(*d*) The serious fall in young stock of 24.23 per cent. since 1912 would be very serious if it could be accepted as a correct statement of existing conditions. It is explained in the report that owing to a misunderstanding in the 1912 census young stock between two and three years of age were in that year included under the heading of calves, whereas in 1920 they were returned as adult cattle. This and other unexplained causes, with probably the already alluded to difficulty of obtaining accurate returns in a census of this nature, under existing conditions, may be taken to discount any serious fall in the number of young animals. The fact that the number of milch cattle has markedly increased discounts any reference to the straitened circumstances of the people being an explanation of the reported reduction in the number of their young cattle.

The statement that the number of imported cattle has fallen can hardly be relied upon, as information regarding the breeding of cattle is often most unreliable and difficult to obtain.

It is stated in the report that "The total number of cattle is now returned at 24,724,234, showing a general decline of 2.56 per cent. over the figure of 1912. The decrease on the whole is variously ascribed to the deterioration of the condition of the cultivators during the past few years, due to high economic strain, to the want of suitable breeding bulls, to lack of grazing grounds, and to the general neglect of the people to devote reasonable care to the management of their cattle. Grazing areas are few, and such as exist are likely to decrease in area in the future. The importance of fodder crops is therefore becoming more and more evident, and their extended cultivation is urgently required." In reading this we must not forget that the report is produced by the Agricultural Department who are never slow in pressing on the public the importance of the cultivation of crops which they consider is peculiarly their own province. The figures given in this census of the total number of each class of animal are so enormous when we remember that we are dealing with only the Presidency of Bengal, a comparative small area of India, that we given them in detail :—

Brahmani bulls		31,141
Other bulls.	Indigenous	1,074,768
„ „	Imported from outside the province	18,695
Bullocks.	Indigenous	7,788,787
	Imported from outside the province	440,963
Cows.	Indigenous	8,022,741
„	Imported from outside the province ..	95,494
Young stock (cattle)		6,225,844

Male buffaloes	639,143
Female buffaloes	260,084
Young stock (buffaloes)	126,574
Sheep	502,867
Goats	3,893,199
Horses and ponies	123,910
Mules	882
Donkeys	1,154
Camels	148
Grand total	29,246,394

If a liberally treated efficient Veterinary Service is required in any part of our Oversea Dominions it is India, and especially the Presidency of Bengal, which stands out as having the greatest claim. Here there is a great wealth of cattle providing a means for carrying on an intensive cultivation which enables a teeming population to exist on probably one of the closest populated areas of our Empire. Without its cattle this great population would starve, and the one official who can keep these animals free from devastating disease is the Veterinary officer. L. J. B.

THE DISEASES OF THE GENITAL ORGANS OF DOMESTIC ANIMALS. By W. L. WILLIAMS, Professor in the New York State Veterinary College at Cornell University, with the collaboration of W. W. WILLIAMS, B.A., D.V.M.—856 pages, with 248 figures, eight of which are coloured. Published by the author at Cornell University, Ithaca, New York. Price 10 dollars.

THIS book is a real contribution to the literature and understanding of the diseases and defects of the genital organs of animals. It covers the whole field comprehensively, and, divided into three parts and twenty-six chapters, it leaves nothing of importance on the subject out of its ken. Its main parts discuss: (*a*) Diseases and Defects not attributable to Infection; (*b*) Tumors of the Genitalia; (*c*) Infections of the Genital Organs.

Professor Williams is bold enough to question the origin and spread of contagious abortion as being due to *Bangs bacillus*. Although he grants that all abortions are due to infection, he denies that such infection is specific. He states that the most serious drawback to the theory has been its failure in practical application. "It was announced 25 years ago that, since the cause of *infectious abortion* had been *proven* it could be controlled. The 25 years which have elapsed have seen no progress in the control of abortion based upon the specific theory." Whilst admiring the author's temerity, we do not think he has examined the case for the other side at all thoroughly, recently, or minutely. Two years ago the County Veterinary Inspector for Ayrshire announced that he had "inoculated 2,658 animals at 132 individual farms with anti-abortion serum. At these farms previous to inoculation 1,388 animals aborted, showing an average of 52·2

abortions. Since inoculation 72 of these farms have become immune or clear of abortion ; at the remainder of the farms 130 animals or a percentage of 4·8 have aborted. The whole result is very satisfactory, especially the fact that *72 farms are now clear of the disease.*" Since then many British practitioners have testified to the real value of anti-abortion inoculation. Whilst differing very acutely with Professor Williams on this point, we go the whole hog with him when he stresses the " policy of guarding sexual health in animals." Too few measures are understood or adopted in this connection over here. Dead fruits and unprofitable fruits do occasion too much material loss and disappointment, and no widespread or efficient steps are taken to check the damage and to avoid sterility and dead or worthless progeny. It is a field that opens up, at the present time, a very important and suitable domain for the expenditure of veterinary effort and advice, and indeed one of the fresh fields that, for our own benefit and that of the nations, ought to be cultivated by us for all it is worth. The illustrations in the book are very explicit ; they are beautifully executed and a very strong and admirable feature ; the text is clear and concise, and the whole get-up of the volume quite American in its excellence.

We wish now to comment on a few points, to mention some that are interesting to our readers, and, perhaps, to criticise one or two statements. The ease with which a mare normally foals is explained by the fact that her vagina is " capable of lateral distension to the full size of the pulvic cavity." " The sexual wanderings of domestic animals constitute an interesting chapter in the dissemination of infectious diseases."

In the chapter on " examination of the female genital organs," the author dwells on the risks of injury the examiner is liable to, and gives elaborate methods for throwing bovines, and mentions special stalls and stanchions which are impracticable in field and farm practice as they exist over here. What about chloroform ? It is quite handy, and beats chloral (as advocated at page 275), especially for the busy country practitioner. The professor decries the use of soaps and disinfectants for vaginal examinations, and believes in salt solution and bland lubricants, such as olive and paraffin oils.

Not coming " in season " is a very wide and prevalent defect in this country, and on this point the author says " it is because of ill-health or some other restraining cause. The restoration of the general health, relief from distinctively genital diseases, and the surgical dislodgement of the inhibiting *corpus luteum*," are the remedies.

Excessive sexual use has a place of importance in the book. We believe it is far too common here. In Switzerland cows at pasture number about 50 to one bull, whilst in America one bull to 20 or 25 cows is suggested. The service of two or three hundred mares yearly by one stallion is too large a figure, and the professor's belief that " most males are called upon to copulate too frequently " has a real foundation in fact. In France, where they have studied zootechny far more closely and systematically than we have here, they estimate 40 to 50 mares in a season for a thoroughbred, 60 for a light horse or vanner, and 80 or 90 for a cart stallion, and P. Diffloth says " these figures cannot be exceeded without danger."

The chapter on " Coital Injuries " (pp. 205 to 227) is a very valuable one indeed. It will be almost a classic for use in law cases. Occasionally we meet with peculiar injuries to the genital organs of the female that are difficult to explain and puzzle us completely. A light may be thrown on one or two of them if we carefully read the lines on " Sodomy and Sadism."

The illustration at page 298 of the penis of a bull affected with nodular venereal disease would indirectly lead the deductor to believe that the bull may be a potential spreader of abortion notwithstanding all statements to the contrary.

An assertion by the author at page 375 is interesting : " Some outbreaks of so-called contagious abortion are entirely referable to a lessened vitality of the spermatozoa," lack of vitamines, perhaps, as a contributory cause. Proof of this statement is entirely wanting here because nobody ever examines a bull's semen.

The chief factor in the causation of *retained fœtal membranes* is " a streptococcus of the viridous group associated at times with a colon bacillus." The author does not believe that *B. abortus* produces the state.

We had hoped to hear more helpful directions as to the treatment of *necrotic vaginitis*, but the author does not aid us much, and his directions are nothing like those which some successful practitioners have adopted over here. The cases are always troublesome ones, and light is needed on their proper treatment.

In sheep the author states that nothing is so far known which can check abortion. He rightly puts stress on the mating of genitally sound animals, and believes that one ram to 26 ewes is the right figure.

The professor has done a great service to the veterinary profession in all English speaking countries. If at times some of his statements and advice seem academic and suitable only for adoption by the trained specialist, yet they are of great scientific value, and point to the heights to which even the general practitioner should strive to attain. G. M.

REPORT OF THE VETERINARY DIRECTOR-GENERAL FOR CANADA FOR THE YEARS ENDING MARCH 31, 1919, AND MARCH 31, 1920. Published by the Department of Agriculture, Canada. Price 5 cents. (Printed by Thomas Mulvey, Printer to the King's Most Excellent Majesty, Ottawa.)

THIS report, submitted by F. Torrance, B.A., D.V.Sc., deals with two years' work in Canada, is correctly written, and yet gives the reader an excellent survey of all the fine veterinary work that is being done in the Dominion under the Veterinary Director-General's mature guidance. The opening lines of the document are very happy reading : " None of the epizootic diseases which cause most anxiety to sanitary officials, such as foot-and-mouth disease, cattle plague and contagious pleura-pneumonia, have been found within our borders." Glanders, hog cholera and cattle mange have chiefly occupied the staff, and have been kept under control and progress accomplished. Glanders occurred in the Northern part of Saskatchewan and Manitoba among horses used in hauling winter supplies to and from the mines in Le Pas district. Its origin was unknown, but infection is now stamped out.

Herds of hogs increased considerably in extent, and when outbreaks of cholera occurred many animals were usually involved. Repressive measures include licensing of all persons who collect and feed garbage to hogs, use of serum, disinfection of premises, and a period of three months' quarantine during which no fresh hogs are allowed on the premises, and by these means outbreaks were promptly controlled and losses reduced to a minimum. Cattle mange, of which there were over 500 cases in the two years, is now being actively combated by compulsory dipping (each subject twice) and allocation of dipping areas, tanks, and committees.

In connection with cattle tuberculosis, the accredited herd plan is now being adopted in Canada. The tests for tuberculosis include the subcutaneous, intradermal, and ophthalmic tests, and the Director-General speaks highly of the intradermal test: "It relieves the inspector of the drudgery of prolonged observation of temperature, it economises the time of inspectors, and it is not readily interfered with by accidental or intentional influences. It can also be applied frequently to the same animal without producing immunity to tuberculin." Everyone knows that under the subcutaneous method of testing with tuberculin no veterinary surgeon is adequately paid for his work in this country, and if the intradermal method is less troublesome and more exact there is a chance of payment being adequate for the work. In some of the States of America this test has been official for some time.

Tuberculosis in swine carcases has been pretty frequent, and the Director-General says: "It could be wiped out if we had compulsory pasteurisation of milk and its by-products used in the feeding of swine."

In 1919 Canada exported over 160,000,000 lbs. of pork and over 2½ million pounds of lard. We always like this report from Canada It is a live one, and the Department of Agriculture a go-ahead one.

G. M.

R.A.V.C. OLD COMRADES' DINNER.

THE first annual reunion dinner of the R.A.V.C. Old Comrades' Association was held at the Holborn Restaurant on Monday evening, November 7, 1921. Major-General Sir Layton Blenkinsop, K.C.B., D.S.O., Director-General A.V.S., and Colonel Commandant of the Royal Army Veterinary Corps, presided. There was the usual toast list, and after the dinner an excellent programme of music and recitation was provided by a quartette from the original Lena Ashwell concert party, who toured amongst the troops in France during the war. Over 200 past and present members of the Corps sat down to the excellent dinner provided, and a very pleasant and enjoyable evening was spent.

NOTICES.

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